# Progress Report - Vulcan Depth Perception
Using Feature displacement
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Previously the plan was to attempt to use and adjust a CNN to perform depth perception. The results proved to be less accurate than expected and difficult to improve. Currently the intention is to use multiple week indicators to determine whether there is a great disparity in depth. In our last meeting we discussed using the depth image from the CNN in addition to edge detection to solidify the observation. Another idea that was mentioned was the use of feature displacement and odometry to get some insight about depth change.

Having worked with panorama stitching before, I focused on coding features extraction code from Vulcan images and calculating their displacements. Below is an images showing the first results of matching features from two consecutive images taken by the camera on Vulcan. The code sill requires a set of equations that can relate the position of the feature in the image and expected displacement of feature based on location. The intention is to use this method to inspect a small piece of the image to try and avoid having to deal with indicating if the features are in a different plane. To further tune and test the code the tests should be performed on two images of a drop-off.
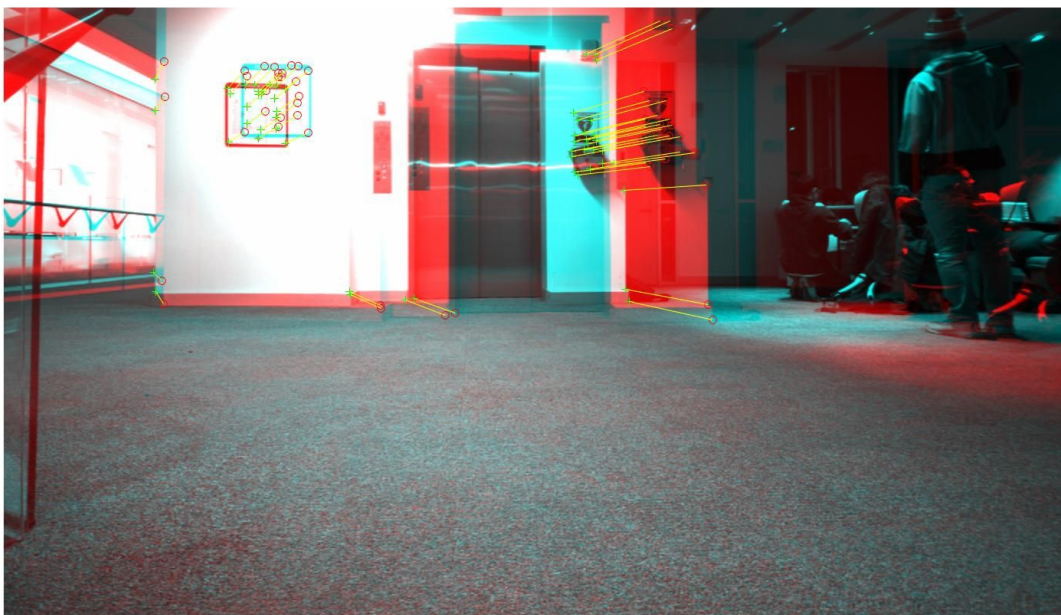
Figure 1: This image is a combination of two images from the vulcan camera. The red hugh is an image taken after the wheelchair moved forward and to the left. The edges between circles and crosses indicate which features are those that were determined to be identical. Feature displacement shown reflect the chair's motion. Some corners were not captured, further tuning of the size of the sift features used and harris corner intensity can change that.